FORM 1

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

APPLICATION ACCEPTED AND AMENDMENTS

APPLICANT FOR A STANDARD PATENT

I/we, SONY CORPORATION

of 7-35 KITASHINAGAWA 6-CHOME,
SHINAGAWA-KU,
TOKYO, JAPAN

hereby apply for the grant of a standard patent for an invention entitled “NEGATIVE TO POSITIVE IMAGE CONVERTING APPARATUS” which is described in the accompanying complete specification.

Details of basic application(s):

Number of basic application

Name of Convention country in which basic application was filed

Date of basic application

U.M. 65317/81

JAPAN

May 6th, 1981

My/our address for service is care of CLEMENT HACK & CO., Patent Attorneys, 140 William Street, Melbourne, Victoria, 3000, Australia.

DATED this 19th day of APRIL 1982

SONY CORPORATION

To: The Commissioner of Patents.

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to image converting apparatus...
In support of the application made by SONY CORPORATION for a patent for an invention entitled APPARATUS FOR USE IN CONVERTING FILM STILLS INTO VIDEO SIGNALS.

Name(s) of Applicant(s)

Title

In support of the application made by SONY CORPORATION for a patent for an invention entitled APPARATUS FOR USE IN CONVERTING FILM STILLS INTO VIDEO SIGNALS.

Title

In support of the application made by SONY CORPORATION for a patent for an invention entitled APPARATUS FOR USE IN CONVERTING FILM STILLS INTO VIDEO SIGNALS.

1. I am/we are the applicant(s) for the patent, or am/are authorised by the abovementioned applicant to make this declaration on its behalf.

2. The basic application(s) as defined by Section 141 of the Act was/were made in the following country or countries on the following date(s) by the following applicant(s) namely:

   Date of basic application

   Country, filing date and name of Applicant(s)

   Name(s) and address(es) of person(s) making declaration

   3. The said basic application(s) was/were the first application(s) made in a Convention country in respect of the invention the subject of the application.

   4. The actual inventor(s) of the said invention is/are OSAKU KUNO, of 4953, Iiyama, Atsugi-shi, Kanagawa-ken, Japan and TOORU TAKAMIYA, 3-6-2-1208, Isogo, Isogo-ku, Yokohama-shi, Kanagawa-ken, Japan.

   5. The facts upon which the applicant(s) is/are entitled to make this application are as follows:

      The Applicant is the Assignee of the actual inventors.


DECLARED at Tokyo, Japan this 18th day of December 1985

SONY CORPORATION

SHI JI WAKAYAMA
General Manager Patents Div.

This form may be completed and filed after the filing of a patent application but the form must not be signed until after it has been completely filled in as indicated by the marginal notes. The place and date of signing must be filled in. Company stamps or seals should not be used.
APPARATUS FOR USE IN CONVERTING COLOUR FILM STILLS INTO VIDEO SIGNALS

SONY CORPORATION

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Claim

1. An apparatus for use in converting colour film stills into colour video signals, the apparatus comprising:
   an elongate base member having provision at one end for mounting a colour video camera thereon; and
   a housing mounted perpendicularly to the base member at the other end thereof, said housing comprising a
   lamp housing wherein a lamp holder is disposed, a mirror housing wherein a mirror is disposed for reflecting light
   originating from said lamp housing to said colour video camera, a space between said lamp housing and said mirror
   housing into which a film holder can be inserted, guide means for guiding said film holder being provided on said
   mirror housing, a colour filter means in said light path between said lamp housing and said guide means to compensate
   for the characteristics of the base material of film in said film holder, and a colour video camera mounted on said one
   end of the base member and having a negative to positive inversion switch for switching in or out a colour signal
   processing circuit for negative to positive image conversion.
Name of Applicant: SONY CORPORATION

Address of Applicant: 7-35 KITASHINAGAWA 6-CHOME,
SHINAGAWA-KU,
TOKYO, JAPAN

Actual Inventor: 

Address for Service: CLEMENT HACK & CO.,
140 William Street,
Melbourne, Vic. 3000.
Australia.

Complete Specification for the invention entitled: "NEGATIVE TO POSITIVE IMAGE CONVERTING APPARATUS"

"APPARATUS FOR USE IN CONVERTING COLOUR FILM STILL INTO VIDEO SIGNALS"

The following statement is a full description of this invention, including the best method of performing it known to me:

PP CF1F/2/81
BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to image converting apparatus, for converting film stills into video signals.

Description of Prior Art

Known apparatus for converting film stills into video signals for recording or presentation on television have the disadvantage that they are bulky, require the use of powerful projection lamps, have problems with heat dissipation, and have cumbersome film holder units.

SUMMARY OF THE INVENTION

One object of the present invention is to provide an improved image converting apparatus for converting stills into video signals.

Another object of the present invention is to provide an image converting apparatus having an improved provision for film holder units.

Another object of the present invention is to provide an image converting apparatus of a compact type.

According to the present invention there is provided an apparatus for use in converting colour film stills into colour video signals, the apparatus comprising:

- an elongate base member having provision at one end for mounting a colour video camera thereon; and
- a housing mounted perpendicularly to the base member at the other end thereof, said housing comprising a lamp housing wherein a lamp holder is disposed, a mirror housing wherein a mirror is disposed for reflecting light originating from said lamp housing to said colour video camera, a space between said lamp housing and said mirror housing into which a film holder can be inserted, guide means for guiding said film holder being provided on said mirror housing, a colour filter means in said light path between said lamp housing and said guide means to compensate for the characteristics of the base material of film in said film holder, and a colour video camera mounted on said one end of the base member and having a negative to positive inversion switch for switching in or out a colour signal processing circuit for negative to positive image conversion.
The above, and other objects, features and advantages of this invention will be apparent from the following detailed description of illustrative embodiments which is to be read in connection with the accompanying drawings.
BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a part sectional view of an embodiment of negative to positive image converting apparatus according to the invention with a video camera mounted thereon.

Figure 2 is a view of the image converting apparatus of Figure 1 when disassembled;

Figure 3 is a plan view from above of a base member of the image converting apparatus of Figure 1;

Figure 4 is a plan view from below of the bottom part of a lamp and mirror housing in which the base member of the image converting apparatus of Figure 1 is to be located;

Figure 5 is an end view of the base member and the lamp and mirror housing showing in detail a screw knob for engaging the lamp and mirror housing to the base member;

Figure 6 is a plan view from below of the bottom part of the lamp and mirror housing in which the base member has been located;

Figure 7 is a perspective view of an example of a mirror housing;

Figure 8 is a perspective view of another example of a mirror housing;

Figure 9 is a sectional part view of a further example of a mirror housing;

Figure 10 is a detailed cross-sectional view of part of the mirror housing of Figure 9;

Figure 11 is an example of a film holder to be located between the lamp housing and the mirror housing of the image converting apparatus of Figure 1; and

Figure 12 is a sectional view of the film holder enclosing a film and taken along line 12-12 of Figure 11.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring first to Figure 1, a video camera 1 with a lens mount 2 having an adaptor lens (close-up lens) 3 attached is located into a recess 10 at one end of a base member 5 and is secured in position by a screw bolt 11 which engages into a
screw box 4 of the video camera 1 by a rotatable knob 12.
The video camera 1 includes a negative/positive inversion switch
which is connected to a color video signal processing circuit
the operation of which will be described later. The
adaptor lens 3 and the mount 2 may be supported by a resilient
member 6 made from, for example, a felt material which is
attached to the base member 5. At the other end of the base
member 5 there is a cylindrically-shaped housing 7 having one end
located onto the base member 5, the housing 7 comprising a lamp
housing 7a in which is disposed, for example, a 60 watt lamp 14
which is supported by a lamp holder 13. The lamp holder 13
is attached to a detachable member 7b which is located at the
upper end of the lamp housing 7a and comprises cooling fins 7c.
The detachable member 7b and the fins 7c are ideally made from
a good thermally-conducting material so that heat may be
dissipated away from the lower part of the lamp housing 7a.
At the lower end of the housing member 7a is a transparent but
thermally-conducting member 25 which is located in a recess in
the lower end of the housing 7a and adjacent to a shield portion
7d. The thermally-conducting member 25 assists heat dissipation
away from apparatus disposed beneath the lamp housing 7a.
A mirror housing 7e which is part of the cylindrically
shaped housing 7 is located onto the base member 5. The mirror
housing 7e encloses a mirror 15 which is located on a rotatable
shaft 16. The mirror 15 is externally rotatable about the
shaft 16 which, if rotated through small angles, will have the
effect of converging and diverging the verticals in the image
of a film being projected. The mirror housing 7e has two
apertures, a first aperture 21 which is located at the top end
of the mirror housing 73 for allowing light to pass from the
lamp housing 7a down to the mirror 15 located within the mirror
housing 7e, and a second aperture 20 for allowing the light
reflected by the mirror 15 to pass through the side of the
mirror housing 7e and into the lens 3 on the video camera 1.
Disposed between the thermally-conducting member 25 and the first aperture 21 is a means for inserting color filters 23 in the light path, which are supported in a holder 24, the holder 24 being located in a slot in the lower part of the lamp housing 7a between the conducting member 25 and a diffuse glass plate 26. Below the filter 23 is located the diffuse glass plate 26 which serves to scatter the light originating from the lamp 14. A film spring plate 27, one end of which is fixed to the lamp housing 7a, is disposed in a space between the lamp housing 7a and the mirror housing 7e, the space providing room for a film holder 40 to be easily inserted in the path of light originating from the lamp 14. The spring plate 27 assists the location of the film holder 40 between projecting guide pins 28 and the first aperture 21. The lower part of the mirror housing 7e is shown mounted against an abutment flange 8 of the base member 5 which abuts against a portion 34 of the mirror housing 7e in a manner which will be described later.

Figure 2 shows how the cylindrically shaped housing 7, the base member 5 and the video camera 1 relate to one another before assembly.

Figure 3 is an above plan view of an example of the base member 5 showing the recess 10 where the video camera 1 is located, and also showing the location of the screw bolt 11 and the rotatable knob 12 by means of which the video camera 1 is fastened to the base member 5. A top flat portion 9 of the base member 5 extends from the end at which the cylindrically shaped housing 7 is located to substantially two-thirds of the total length of the base member 5, the housing end of which is semi-circular in shape to conform to the cylindrical shape of the housing 7 with which it locates. The edges of the flat portion 9 comprises a flange 8a shown by dotted lines in Figure 3, the flange 8a comprising substantially parallel sides which extend down in a vertical direction perpendicular to the flat portion 9 to a depth equal to that of the height...
of the base member 5 as illustrated in Figure 5. At the housing end of the base member 5, the flange 8a is displaced inwardly of the flat face 9 as shown by a dotted line 8b in Figure 3. This makes way for the abutment flange 8 which runs along the end edge of face 9 and is outwardly inclined with respect to the perpendicular to the flat portion 9. The lower edge of the abutment flange 8 rests on a plate 33 which is secured to the underside of the cylindrical housing 7 base by screws 35. The plate 33 is also semi-circular at one end to conform to the cylindrical shape of the housing 7 and also to the abutment flange 8. This results in an accurate engagement between the abutment flange 8 and the plate 33 of the underside of the housing 7 as illustrated in Figures 5 and 6. Furthermore the base member 5 is located in a lateral direction by the contact of the abutment flange 8 against the portion 34 of the housing 7 as shown in Figure 1.

Figures 4, 5 and 6 show a tightening knob 36 which is located between the plate 33 and the bottom face of the housing 7. By tightening the tightening knob 36 which comprises a threaded portion 37 running through a threaded nut 38, a plate 39 may be pushed up against a lower flange 32 of the housing 7 thus securing the housing 7 against the base member 5.

Figure 7 illustrates an example of a mirror housing 6b wherein the apertures 20 and 21 correspond to those in Figure 1. Also shown in Figure 7 are rotation knobs 17 and 18 which are connected to the shaft 16 thus enabling the mirror 15 to be externally rotated about the shaft 16 as shown in Figure 1. As an alternative, the mirror 15 may be fixed with its general plane at 45° to the axis of the cylindrically-shaped housing 7. On the top surface of the mirror housing 7e are located the projecting guide pins 28 of, for example, a substantially hemispherical shape of radius 2mm, which guide the film holder 40 over the aperture 21. The projecting guide pins 28 ensure that the film holder 40 may be easily located over the aperture 21 provided that they are spaced far enough apart for the
holder 40 to move between them freely, thus enabling a
negative 47 (a color or black and white film) to be moved
relative to the aperture 21 so that any details to be zoomed in
on by the video camera 1 may be at the centre of the picture.

In this example, the projecting guide pins 28 are equally spaced
so that the film holder 40 may be moved backwards or forwards
over the aperture 21 in the directions shown by arrows A in
Figure 7, and may also be rotated about 90° so as to slide in
directions shown by arrows B in Figure 7.

Figure 8 illustrates another example of a mirror housing
7e wherein the projecting guide pins 28 are of a more substantial
structure than those of Figure 7.

Figure 9 illustrates a further example of a mirror housing
7e wherein the housing 7e has a large circular aperture 21b
and has a guiding means 28a for guiding film holder 40 fixed to
a base 29 which is rotatably supported between spring clips 30
and a circular housing flange 22. Alternatively, the base
29 may be rectangular in shape, and fixed by spring clips 30
in a square aperture (not shown), the film holder 40 being held
in supporting means 28a rotatably mounted on the base 29.

Figure 10 shows in detail a construction of the clip 30
and the disposition of the base 29 with respect to the housing
flange 22. In the case where the base 29 is rotatably mounted
in the aperture 21b, it may be desirable to locate precisely
the base 29 in the plane of rotation. In this case, the base
29 has a rounded annular groove 31 on its lower lateral face
which locates a corresponding annular projection or a series of
hemispherical projections 31a arranged in an annular way in the
clip 30. The clip 30 is secured to the mirror housing flange
by a screw 30a, the shape of a clip 30 being such that an upward
pressure is exerted onto the base 29 to keep it firmly in
location.

Figure 11 is an example of the film holder 40 comprising
an upper and lower frame 41a and 41b respectively, each having
a plurality of windows 43a and 43b respectively of size
appropriate to the film to be used. The frames have hinges
42 on one side so that the upper and lower frames 41a and 41b
may be folded over one another, the upper frame having a
plurality of projections 44a along its sides while the other
frame has corresponding holes 44b disposed to receive the
projections 44a. The projections 44a serve to guide the negative
47 when inserted into the holder 40.

Figure 12 is a cross-sectional view taken along lines 12-12
of Figure 11 of the two plates 41a and 41b when they are closed
and have a negative 47 between them.

As previously described, the detachable member 7b and the
fins 7c are made out of a thermally-conducting material for
cooling purposes but the lamp holder 13 is preferably made from
a plastics material. Although the remainder of the apparatus
may be made out of a plastics material, either all or some of
the components may be made out of metal, for example, the clip
30 and the screws 35.

The operation of the negative to positive image converting
apparatus will be now be described in detail with references to
the accompanying drawings. The lamp 14 of the lamp housing 7a
shines through the negative 47 which is secured in the holder
40, the holder 40 being secured between the spring plate 27
and the aperture 21 of the mirror housing 7e so that the image
of the negative 47 is reflected off the mirror 15 and into the
lens of the video camera 1 which supplies a television signal
representing the image of the negative 47. The colors are
reversed in a negative and for the video camera 1 to show a
positive image, it is necessary to switch in a circuit to
reverse the colors. This may be done by switching in a color
video signal processing circuit 46 by a negative to positive
inverter switch 45. The switching in of the circuit 46 changes
the gamma compensation characteristics and the automatic gain
control (AGC) semi-peak detection changes to peak detection.
The switch also switches in a luminance signal (the signal
determining the brightness and the individual color contributions
of the signal) inverter and a chrominance signal (the signal added to the luminance signal to provide color information) inverter so that the signals which correspond to black in the negative 47 become white and vice versa, the colors are also changed to their inverse. When a positive, that is a transparency, is to be shown, then the switch 45 is simply switched to the positive position which switches out the circuit 46 and thus the colors of the image originating from the positive remain unchanged. Although the negative 47 has generally been taken to be a color film, a black and white negative may also be used in the above described arrangement. The video camera 1 may include color controls such as a hue control which may be adjusted to compensate for color casts of the negative 47 or positive, or alternatively color casts may be added to enhance particular color features of the negative 47. A hue control may also be used for compensating variations in the color of the base material on which the print 47 is made, as this frequently varies according to the particular type of film manufacture. Furthermore, the filters 23 may be changed to compensate for varying characteristics in the type of film used. An automatic gain control circuit in the video camera 1 is operative to compensate for dark and light negatives 47 and positives, and to adjust according to the quantity of light received by the camera.

The output signals which are representative of the image from the negative 47 may be transmitted to a television receiver to be displayed on the screen thereof or to a video tape recorder which may include an editor for adding information to the signal such as captions.

The embodiment according to the present invention as described above has the advantage that it has a compact and upright projection part which uses low power projection lamps, heat is kept well away from the video apparatus and lenses, it facilitates the easy changing of filters and may be used with many different types of film holder. The apparatus also has a negative to positive control switch for switching in the
appropriate circuits according to whether a positive or negative print is to be projected. The switch 45 is operated manually in the above described embodiment but alternatively, the apparatus may comprise an automatic switch so that the signal processing circuit 46 may be switched into the appropriate image converting mode when the camera 1 is mounted onto the base member 5, possibly by means of the rotatable knob 12. The apparatus also has the advantage that the video camera is easily detachable from the base of the apparatus and the base and housing part may themselves be separated for easy carrying and compact storage.

Although illustrative embodiments of the invention have been described in detail herein with reference to the accompanying drawings, it is to be understood that the invention is not limited to those precise embodiments, and that various changes and modifications can be effected therein by one skilled in the art without departing from the scope and spirit of the invention as defined by the appended claims.
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CLAIMS
THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An apparatus for use in converting colour film stills into colour video signals, the apparatus comprising:
   an elongate base member having provision at one end for mounting a colour video camera thereon; and
   a housing mounted perpendicularly to the base member at the other end thereof, said housing comprising a
   lamp housing wherein a lamp holder is disposed, a mirror housing wherein a mirror is disposed for reflect light
   originating from said lamp housing to said colour video camera, a space between said lamp housing and said mirror
   housing into which a film holder can be inserted, guide means for guiding said film holder being provided on said
   mirror housing, a colour filter means in said light path between said lamp housing and said guide means to compensate
   for the characteristics of the base material of film in said film holder, and a colour video camera mounted on said one
   end of the base member and having a negative to positive inversion switch for switching in or out a colour signal
   processing circuit for negative to positive image conversion.

2. Apparatus according to claim 1 wherein said film holder can be rotated in the guide means in the plane of
   said film.

3. Apparatus according to claim 1 or claim 2 wherein said mirror is rotatable manually from outside said mirror
   housing.

4. Apparatus according to claim 1 wherein the negative to positive inversion switch is switched automatically when the video camera is mounted onto the base member.

5. Apparatus for use in converting colour film stills into colour video signals, the apparatus being substantially
   as herein before described with reference to and as illustrated in the accompanying drawings.

DATED this 7th day of NOVEMBER, 1985

SONY CORPORATION
By Its Patent Attorneys:

CLEMENT HACK & CO.
A description of this invention, including the best method of performing it known to.
switch for switching in or out a colour signal processing circuit for negative to positive image conversion.

Proposed: 7/11/85
a plurality of windows 42a and 43b respectively of size
The switch also switches in a luminance signal (the signal determining the brightness and the individual color contributions).
Status also has

![Diagram of Fig. 7 with labeled parts: 22, 21, 28, 7e, 40, A.]

![Diagram of Fig. 8 with labeled parts: 28, 7e, 21, 20, 32.]

![Diagram of Fig. 9 with labeled parts: 22, 21b, 28a, 29, 30, 40, 7e.]

[Note: Diagrams are not legible due to the nature of the image.]
into colour video signals, the apparatus being substantially as herein before described with reference to and as illustrated in the accompanying drawings.

DATED this 7th day of NOVEMBER, 1985

SONY CORPORATION
By Its Patent Attorneys:

CLEMENT HAY & CO.
Fellows Institute of Patent
Attorneys of Australia.

END